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MONTANA FISH, WILDLIFE AND PARKS FISHERIES DIVISION

Draft Environmental Assessment of the Removal of Non-native Fishes with Rotenone and Restoration of Westslope Cutthroat Trout to Camas Lake and Upper Big Camas Creek

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: Removal of non-native Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*) from Big Camas Creek and Camas Lake (Smith River Drainage) above a natural waterfall fish barrier using EPA registered piscicides containing rotenone. After removal of non-native fish, native westslope cutthroat trout (WCT: *Oncorhynchus clarkii lewisi*) would be introduced into both Big Camas Creek and Camas Lake.

- Other alternatives considered during development of the proposed action include
- No action - Status quo management.
- Electrofishing/netting removal of non-native YCT

The predicted benefits of the proposed action include:

- Increase in total miles of non-hybridized WCT inhabited stream in the Smith Drainage from 13 to 16.5 miles (25% increase in the Smith Drainage) and restoration of a 6 surface acre natural lake.
- Replication of an existing population of non-hybridized WCT in the Smith Drainage.
- Reduction in the risk of potential listing under the Endangered Species Act.
- This project would also provide a unique opportunity for anglers to fish for Montana's native trout in an accessible area of the Helena National Forest.

B. Agency Authority for the Proposed Action:

Montana Fish, Wildlife & Parks (MFWP) powers and duties: The department shall implement programs that:

- (i) manage wildlife, fish, game, and nongame animals in a manner that prevents the need for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq.;
- (ii) manage listed species, sensitive species, or a species that is a potential candidate for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq., in a manner that assists in the maintenance or recovery of those species. Section 87-1-201(9)(a) M.C.A.

Montana Fish, Wildlife & Parks Fisheries Bureau manages and perpetuates Montana's fish and other aquatic resources and, specifically, maintains optimum fish populations in Montana waters, and provides the diverse, quality angling opportunities that Montanans and visiting

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anglers demand. The bureau operates nine fish hatcheries, which are not decentralized and report directly to the bureau. Section 87-1-702, M.C.A.

Montana Fish, Wildlife & Parks is a signatory to the Memorandum of Understanding and Conservation Agreement (MOU) for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana (MFWP 2007) which states: “The management goals for cutthroat trout in Montana are to: 1) ensure the long-term, self-sustaining persistence of each of the subspecies distributed across their historical ranges, 2) maintain the genetic integrity and diversity of non-introgressed populations, as well as the diversity of life histories represented by remaining cutthroat trout populations, and 3) protect the ecological, recreational, and economic values associated with each subspecies.” Additional signatories to the MOU include, American Wildlands, Blackfeet Tribal Business Council, Confederated Salish and Kootenai Tribe, Federation of Fly-Fishers, Greater Yellowstone Coalition, Montana Chapter American Fisheries Society, Cutthroat Trout Conservation, Montana Cutthroat Trout Technical Committee, Montana Department of Environmental Quality, Montana, Department of Natural Resources and Conservation, Montana Farm Bureau Federation, Montana Fish, Wildlife & Parks, Montana Stockgrowers Association, Montana Trout Unlimited, Montana Wildlife Federation, USDA Natural Resource Conservation Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDA Forest Service, Yellowstone National Park.

C. Estimated Commencement Date: August 2013

D. Name and location of the project: removal of non-native fishes with rotenone and restoration of westslope cutthroat trout to Camas Lake and Big Camas Creek.

Big Camas Creek is a small second order stream which forms Camas Creek approximately 9 miles upstream of Fort Logan, MT and 17 miles upstream of the confluence of Camas Creek and the Smith River. The reach of stream (approximately 3.5 miles) that would be treated with rotenone is on Helena National Forest between 46.5428°N, 111.2395°W (downstream end) and 46.5562°N, 111.3011°W (upstream end). The nearest private land on Big Camas Creek is 0.80 miles downstream from the treatment area (Figure 1).

E. Project Size (acres affected)

1. Developed/residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian – Approximately 3.5 miles of stream and 6 acre surface area lake
5. Floodplain – 0 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres
9. Rangeland – 0 acres

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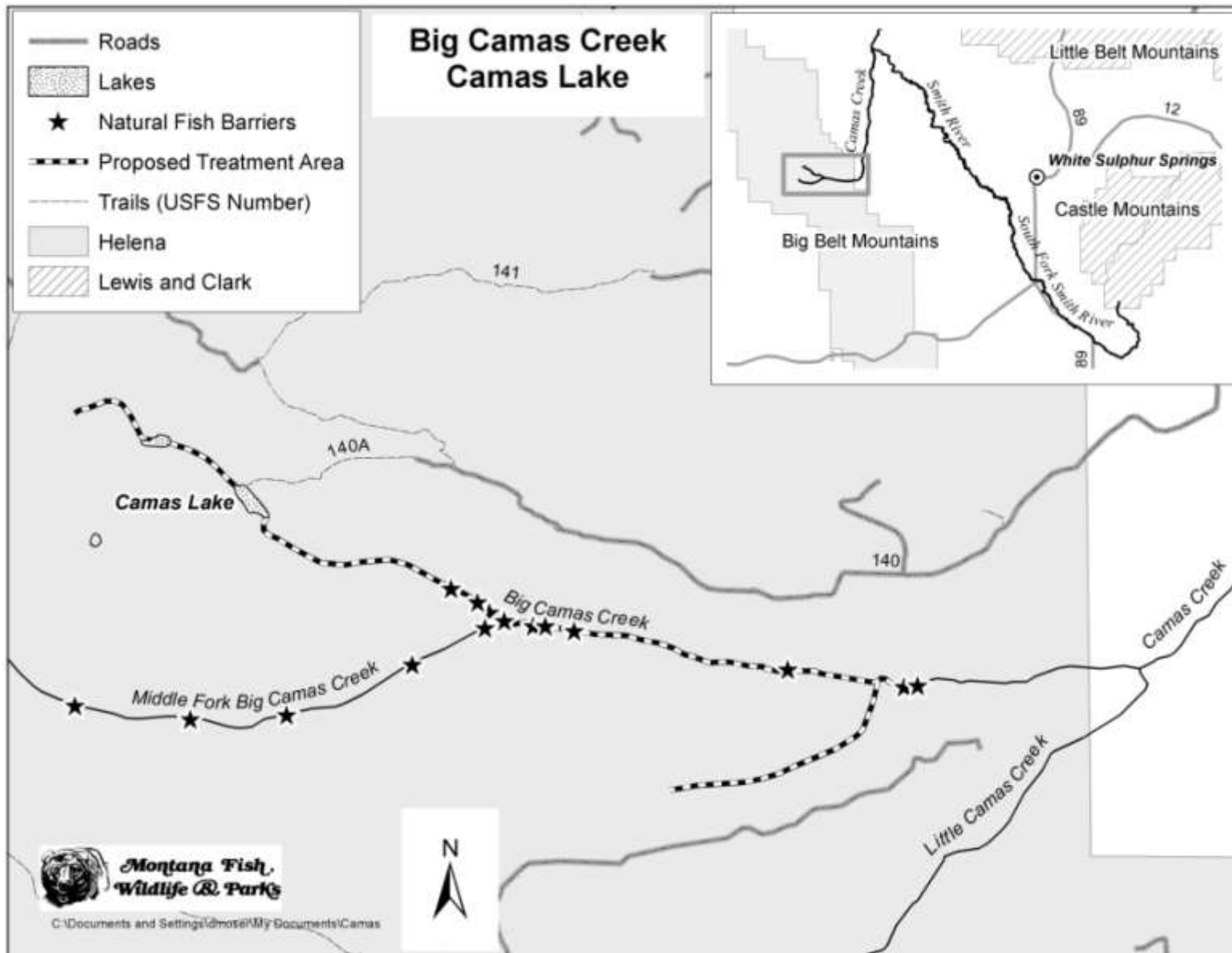


Figure 1. General project area and length of stream proposed for removal of non-native fishes.

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F. Narrative Summary of the Proposed Action and Purpose of the Proposed Action

Currently, approximately four miles of upper Big Camas Creek and Camas Lake supports Yellowstone cutthroat trout (YCT). The YCT population in Camas Lake and Big Camas Creek is the result of stocking of Camas Lake by Montana Fish, Wildlife & Parks (MFWP) in 1938 and 1940 (26,700 fish). Middle Camas Creek supports non-hybridized westslope cutthroat trout (WCT). In 2003 and 2005, non-hybridized WCT were stocked above a natural falls barrier on Middle Camas Creek (Figure 1).

This proposed action would involve removing non-native YCT from 3.5 miles of Big Camas Creek and Camas Lake using EPA registered piscicides (Figure 1). After non-native YCT are removed, Camas Lake and Big Camas Creek would be restocked with locally obtained native WCT. The Camas Lake YCT population is self-sustaining. YCT spawn in a small tributary at the north-west corner of Camas Lake (Figure 1). After the proposed rotenone treatment, triploid (sterile) WCT would be stocked in Camas Lake to provide a recreational fishery during the period that native WCT establish a self-sustaining population (approximately 5 to 7 years).

The westslope cutthroat trout is considered a species of concern by the Natural Heritage Network and the State of Montana. Genetically pure WCT occupy about 8% of their historical range in the western United States (Shepard et al. 2007) and less than 4% of their historical range in northcentral Montana within the Missouri River Drainage (MFWP 2010). WCT currently occupy 13 miles of the 740 miles of historically occupied stream in the Smith Drainage (2% of historical). Major threats to WCT throughout their range include competition and hybridization with non-native rainbow and Yellowstone cutthroat trout (Leary et al. 1995; Hitt et al. 2003) and competition with brook trout (Dunham 2002; Peterson et al. 2004). This proposed action would restore WCT to 3.5 miles of Big Camas Creek and increase the total miles of WCT inhabited stream in the Smith Drainage by 27%. Projects which restore WCT to historically occupied habitats are necessary to prevent extinction of WCT. In addition, efforts to stabilize and increase WCT populations would likely reduce the likelihood of a future listing of WCT under the Endangered Species Act; thus preventing imposition of additional federal regulatory restrictions.

Montana Fish, Wildlife & Parks has a long history of using rotenone to manage fish populations in Montana that span as far back as 1948. The department has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation.

Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, Oceania, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s. Rotenone has also been used as a natural insecticide for gardening and to control parasites such as lice on domestic livestock (Ling 2002). Rotenone acts by inhibiting oxygen transfer at the cellular level. It is especially effective at low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals, birds and other non-gill breathing organisms do

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not have this rapid absorption route into the bloodstream, and thus can tolerate exposure to concentrations much higher than that used to kill fish.

The boundaries for the treatment would be from the headwaters of Big Camas Creek downstream through Camas Lake approximately 3.5 miles (Figure 1). The waters between these two points would be treated with CFT Legumine or equivalent product approved by the EPA (5% liquid rotenone) with toxicant effects limited to the stream length within these boundaries. This analysis will focus on CFT Legumine as the product planned for use. Other similar products may be used (e.g. Prenfish). These products will only be used if they are approved for use by the EPA. Environmental impacts of similar products would be nearly identical to CFT Legumine; thus this analysis will specify CFT Legumine as the piscicide to be used in the proposed project. We would follow the label recommendations for concentrations for “normal pond use” (i.e. 0.5 to 1 part per million CFT Legumine or 0.025 to 0.050 ppm active rotenone) but on-site assays using caged fish would determine the appropriate concentrations needed. Streams and lakes similar to Big Camas Creek and Camas Lake where rotenone has recently been used to restore WCT required no more than 1 ppm CFT Legumine. Camas Lake would be treated using a small raft and outboard motor fitted with a pump and diffuser. The concentration of rotenone to be used in the Camas Lake will be determined from surveys of lake volume and use of product label application concentrations. Liquid rotenone would be applied to the stream at regularly spaced intervals (1 to 2 hour stream travel) because of dilution and natural detoxification as rotenone moves downstream. Rotenone would be applied thorough the use of a drip station. Each drip station dispenses a precise amount of diluted rotenone into the stream over a 4 to 8 hour period, based on measured stream discharge in cubic feet per second. A mixture of powdered rotenone (Pretox 7% rotenone), sand, and gelatin may be applied on a very limited basis. A powdered rotenone mix would only be used in springs and seeps that have the potential to provide refugia for the target fish. When the treatment ends, fresh water from untreated areas upstream would begin to dilute the piscicide concentration and oxidation would continue to break down remaining rotenone in Camas Lake and Big Camas Creek.

During treatment, rotenone passing downstream of the lower bounds of the treatment area would be detoxified with the addition of potassium permanganate. According to the CFT Legumine label, potassium permanganate should be applied to water at the appropriate concentration to compensate for organic demand of the stream and/or lake bottom so that enough remains to neutralize the rotenone. The discharge of the stream would be measured prior to treatment and the potassium permanganate would be applied at the rate specified on the CFT Legumine label. In addition, on-site assays would be conducted in this stream prior to the treatment to determine the appropriate amount of permanganate necessary to neutralize the rotenone. Potassium permanganate requires 15 to 30 minutes of contact time (approximately 0.25 miles in streams similar to Big Camas Creek) to fully detoxify the rotenone.

Caged fish would be used to measure the toxicity of the water in Big Camas Creek and Camas Lake to ensure the objectives have been met. After the application, we would use caged fish to evaluate when the waters are no longer toxic to fish and when fish can be restocked. The CFT Legumine label specifies that once caged fish show no signs of distress within 4 hours, the stream water is considered no longer toxic, and detoxification can be discontinued.

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Previous treatments have shown that fish rapidly decay and are difficult to find even after a few days post treatment. However, large accumulations of dead fish would be collected and disbursed on site.

If the objectives of the project were not met with the first treatment, additional treatments may be conducted to fulfill the objectives of the project. Effectiveness of the first treatment would be ascertained through electrofishing surveys of the treated section of Big Camas Creek and gill netting of Camas Lake.

Big Camas Creek and Camas Lake would be restocked with WCT when all non-native fishes are removed. Live fish (juveniles and adults) and eyed eggs hatched in on-site incubators would be obtained from a non-hybridized population of WCT located in the Smith Drainage. Transfers would follow all MFWP policies for wild fish transfers, including: consultation with the MFWP Fish Health Committee, completion of a wild fish transfer request, disease testing, and genetic testing. In addition, a separate EA would be developed prior to transfer of WCT into Big Camas Creek/Camas Lake.

PART II. ENVIRONMENTAL REVIEW

A. PHYSICAL ENVIRONMENT

1. <u>LAND RESOURCES</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X				
c. Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

2. <u>WATER</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						

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a. Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?			X		Yes	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of flood water or other flows?		X				
d. Changes in the amount of surface water in any water body or creation of a new water body?		X				
e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				2f
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?			X		Yes	See 2f
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				2j
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Will the project affect a designated floodplain?		X				
m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			X		Yes	2m

Comment 2a: The proposed project is designed to intentionally introduce a pesticide to surface water to remove unwanted fish. The impacts would be short term and minor. Prentox (7% powder) and CFT Legumine (5% liquid) rotenone are EPA registered pesticides and are safe to use for removal of unwanted fish (other equivalent EPA approved rotenone products may be used; e.g. Prenfish). The concentration of CFT Legumine (5% liquid) proposed is 0.5 to 1 part per million, but could be adjusted within the label allowed limits based upon the results of on-site assays. Prentox (7% powder) may be used in a sand and gelatin mix to treat springs and seeps within the treatment area.

There are three ways in which rotenone can be detoxified once applied. The most common method is to allow natural breakdown to occur. Rotenone is a compound that is susceptible to natural breakdown (detoxification) through a variety of mechanisms such as water chemistry, water temperature, exposure to organic substances, exposure to air, and sunlight intensity (Ware 2002; ODFW 2002; Loeb and Engstrom-Heg 1970; Engstrom-Heg 1972; Gilderhus et al. 1986).

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Camas Lake's shallow profile may promote rapid detoxification of rotenone. Rotenone persistence studies by Gilderhus et al. (1986) and Dawson et al. (1991) found that in cool water temperatures of 32 to 46°F the half-life ranged from 3.5 to 5.2 days. Gilderhus et al. (1986) reported that 30% mortality was experienced in rainbow trout exposed to degrading concentrations of actual rotenone (0.004 ppm) in 46°F pond water 14 days after a treatment. By day 18 the concentrations were sub lethal to trout. The second method for detoxification involves basic dilution by fresh water. This would be through fresh ground water or surface water flowing into a lake or stream. In the case of Camas Lake, an upstream tributary will aid in dilution of treated waters. The final method of detoxification involves the application of an oxidizing agent like potassium permanganate at the downstream end of the treatment. This dry crystalline substance is mixed with stream or lake water to produce a concentration of liquid sufficient to detoxify the rotenone. Detoxification is accomplished after about 15-30 minutes of exposure time between the two compounds (Prentiss Inc. 2007). Inert ingredients (e.g. carriers) in CFT Legumine volatilize rapidly in the environment by both photolysis and hydrolysis and therefore do not pose a threat to the environment at the levels proposed for fish eradication.

Comment 2f: There are no wells located near the proposed Big Camas Creek/Camas Lake treatment area. In addition, no contamination of groundwater is anticipated to result from this project. Rotenone binds readily to sediments, and is broken down by soil and in water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone moves only one inch in most soil types; the only exception would be sandy soils where movement is about three inches (Hisata 2002). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994). Case studies in Montana have concluded that rotenone movement through groundwater does not occur. For example, at Tetrault Lake, Montana neither rotenone nor inert ingredients were detected in a nearby domestic well, which was sampled two and four weeks after applying 90 ppb rotenone to the lake. This well was chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake. In 1998, a Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no sign of rotenone was detected. In 2001, another Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well located 200 feet from that pond was tested four times over a 21 day period and showed no sign of contamination. In 2005, MFWP treated a small pond near Thompson Falls with Prenfish to remove pumpkinseeds and bass. A well located 30 yards from the pond was tested and neither Prenfish nor inert ingredients were found in the well (Don Skaar, MFWP, *personal communications*).

Comment 2j: The CFT Legumine label states "...Do not use water treated with rotenone to irrigate crops or release within 1/2 mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond or reservoir..." There are no irrigation or potable water intakes within 1/2 mile of the proposed treatment area. Recreationists use water from Big Camas Creek and Camas Lake for their pets and horses; and for themselves after filtering. The treatment zone will be thoroughly posted to caution against use of the water while rotenone is being applied and thereafter for a precautionary period, about 4-5 days total.

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Comment 2m: MFWP would apply rotenone under the Montana Dept. of Environmental Quality (DEQ) General Permit for Pesticide Application (#MTG87000). A Notice of Intent was accepted by the Department of Environmental Quality. The NOI included the waters proposed in this EA. A letter was received from DEQ dated August 13, 2012 recognizing the Notice of Intent and allowing MFWP to operate under the General permit for Pesticide Application.

Cumulative Impacts: The proposed action of piscicide treatment would have a short term impact on water quality and potentially a longer term impact on species community composition (not abundance) of primary and secondary producers in Big Camas Creek and Camas Lake. These impacts would attenuate through time and would not impact the productivity of fisheries resources after restocking. We do not expect the proposed action to result in other actions that would create cumulative impacts to water resources in Big Camas Creek or Camas Lake. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to land resources related to treatment of Big Camas Creek or Camas Lake with piscicides.

3. <u>AIR</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))			X		No	3a
b. Creation of objectionable odors?			X		Yes	3b
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				
e. Will the project result in any discharge which will conflict with federal or state air quality regs?		X				

Comment 3a: A gasoline generator would be used to run a dry solid volumetric feeder at the lower end of the treatment area to dispense powdered potassium permanganate (detoxifying agent). The generator would produce some exhaust fumes that would dissipate rapidly.

Comment 3b: CFT Legumine does not contain the same level of aromatic petroleum solvents (toluene, xylene, benzene and naphthalene) of other rotenone formulations (i.e. Prenfish) and as a consequence does not have the same odor concerns and has less inhalation risks. If Prenfish were to be used there would be increased localized and temporary increases in aromatic hydrocarbon odors during treatment. These odors would only be perceptible to piscicide applicators in the immediate vicinity of drip stations on Big Camas Creek or near Camas Lake during boat application.

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Previous treatments have shown that fish rapidly decay and are difficult to find even after a few days post treatment. However, any large accumulations of noxious smelling dead fish would be collected and dispersed on site to hasten decomposition.

Cumulative Impacts: Impacts to air quality from the proposed action of piscicide treatment would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to air quality in Big Camas Creek/Camas Lake. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to air quality related to treatment of Big Camas Creek/Camas Lake with piscicides.

4. <u>VEGETATION</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?			X		No	4a
b. Alteration of a plant community?		X				
c. Adverse effects on any unique, rare, threatened, or endangered species?		X				
d. Reduction in acreage or productivity of any agricultural land?		X				
e. Establishment or spread of noxious weeds?		X				
f. Will the project affect wetlands, or prime and unique farmland?		X				

Comment 4a: During treatment, workers would park at the Camas Lake trailhead and walk a US Forest Service trail (#140 and #140A) to Camas Lake. An inflatable dinghy and small electric or gas motor would be carried into Camas Lake to be used during the treatment. There would be some minor trampling of vegetation along the shores of Camas Lake during treatment. Access to Big Camas Creek would be overland from Camas Lake and from upstream of the lowermost fish barriers (Figure 1). There would be some trampling of vegetation along the stream during the placement and monitoring of drip stations and sentinel fish locations but the degree of impact to vegetation is not anticipated to affect plant vigor. Rotenone does not have an effect on plants at concentrations used to kill fish. Impacts from trampling of vegetation are expected to be short term and minor.

Cumulative Impacts: Impacts to vegetation from the proposed action would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to vegetation in Big Camas Creek and Camas Lake. If the new fishery were to attract more recreational use, vegetation could potentially suffer from increased trampling. However, based on use patterns of other WCT fisheries, and the fact that Camas Creek and Camas Lake already support a non-native Yellowstone cutthroat trout fishery, we would

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conclude that it is very unlikely that the new WCT fishery would attract significant interest and associated higher use levels. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to vegetation related to treatment of Big Camas Creek and Camas Lake with piscicides.

5. <u>FISH/WILDLIFE</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?			X		Yes	5b
c. Changes in the diversity or abundance of nongame species?			X		Yes	5c
d. Introduction of new species into an area?			X		No	5d
e. Creation of a barrier to the migration or movement of animals?		X				
f. Adverse effects on any unique, rare, threatened, or endangered species?	X					5f
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?	X					
h. Will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5f)		X				
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)		X				See 5d

Comment 5b: WCT currently occupy 13 miles of the 740 miles of historically occupied stream in the Smith Drainage (2% of historical). Currently, approximately 3.5 miles of upper Big Camas Creek and Camas Reservoir supports Yellowstone cutthroat trout (YCT; *Oncorhynchus clarkii bouvieri*). The YCT population in Camas Lake and Big Camas Creek is the result of two stocking events; 11,700 fish in 1938 and 15,000 fish in 1940. Two fish barriers (waterfalls) approximately 0.75 miles upstream of the Helena National Forest boundary separate the upstream YCT population from downstream populations of hybridized westslope cutthroat trout and brook trout (Figure 1). Middle Camas Creek enters Big Camas Creek approximately 1.25 miles downstream of Camas Lake (Figure 1). Non-hybridized, locally obtained, WCT were stocked above a natural falls barrier on Middle Camas Creek in 2003 and 2005. The proposed action involves removing non-native fishes from 3.5 miles of Big Camas Creek and Camas Lake (6 surface acres) using piscicides (Figure 1). After non-native fishes are removed, the lake and

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stream would be restocked with non-hybridized WCT obtained from a separate stream in the Smith River Drainage. Full re-colonization of Camas Lake and Big Camas Creek would likely occur in 5 to 7 years. In the interim, sterile triploid WCT could be stocked to provide a recreational fishery in Camas Lake. Once the lake is fully recolonized, MFWP would allow limited harvest of WCT. The current population of YCT supports harvest, and we see no reason why a restored WCT fishery would not also support harvest. Another way to mitigate for the temporary loss of the fishery would include stocking of arctic grayling and sterile/triploid WCT. YCT, much like WCT in the Missouri River, are considered a Species of Special Concern within their historic range (e.g. Yellowstone River Drainage). Removal of YCT from Camas Lake and Big Camas Creek will have no impact on the current status of YCT in Montana.

Comment 5c:

Aquatic Invertebrates:

In general, most studies report that aquatic invertebrates, excepting zooplankton are much less sensitive to rotenone treatment than fish (Schnick 1974). One study reported that no significant reduction in aquatic invertebrates was observed due to the effects of rotenone, which was applied at levels twice as high as the levels proposed for this project (Houf and Campbell 1977). In all studies, the reduction of aquatic invertebrates was temporary, and most treatments used a higher concentration of rotenone than proposed for this project (Schnick 1974). In a study on the relative tolerance of different aquatic invertebrates to rotenone, Engstrom-Heg et al. (1978) reported that the long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of recolonization. Because of their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennack 1989), and generally high reproductive potential (Anderson and Wallace 1984), aquatic invertebrates are capable of rapid recovery from disturbance (Boulton et al. 1992; Matthaei et al. 1996). In northcentral Montana, aquatic invertebrates are routinely collected prior to transfers of WCT to fishless habitat (Petty Creek, N. Fk. Ford Creek, Lonesome Creek, etc.). Most invertebrates collected prior to transfers were commonly found throughout Montana and in no cases were rare or endangered species of invertebrates discovered (Daniel Gustafson, *personal communication*). These collections, in high elevation, remote stream reaches, indicate that the probability of eliminating a rare or endangered species in Big Camas Creek and Camas Lake is very unlikely. Prior to any piscicide treatment, invertebrates would be collected from Big Camas Creek to verify that no rare species are present. Headwater reaches of Camas Creek that do not hold fish would not be treated with fish piscicides and would provide a source of aquatic invertebrate colonists. In addition, recolonization would include aerially dispersing invertebrates from downstream areas of Big Camas Creek (e.g. mayflies, caddisflies). The small size of the proposed treatment (3.5 miles of stream) and the proximity of source areas should aid in rapid recovery of the Big Camas Creek/Camas Lake aquatic community. The aquatic invertebrate community structure in Big Camas Creek and Camas Lake may be temporarily affected by the treatment (i.e. ratio of gilled to non-gilled invertebrates). Natural-caused (e.g. fire) and anthropogenic (livestock grazing) disturbances also impact the structure of aquatic invertebrate communities (Wohl and Carline 1996; Mihuc and Minshall. 1995; Minshall 2003). Moreover, fire caused changes in trophic dominance may last greater than 15 years because of post-fire changes to stream geomorphology and riparian species composition (Minshall 2003). Treatment

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with piscicides temporarily changes the ratio of certain invertebrate species, not the physical stream environment. This would necessarily have far less of an impact than long term physical changes to the stream/riparian interface.

Mammals, Birds, and Amphibians:

Mammals are generally not affected because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Laboratory tests by Marking (1988) involved feeding a form of rotenone to rats and dogs as part of their diet for periods of six months to two years and observed effects such as diarrhea, decreased food consumption, and weight loss. He reported that despite unusually high treatment concentrations of rotenone in rats and dogs, it did not cause tumors or reproductive problems in mammals. Studies of risk for terrestrial animals found that a 22 pound dog would have to drink 7,915 gallons of treated lake water within 24 hours, or eat 660,000 pounds of rotenone-killed fish, to receive a lethal dose (CDFG 1994). The State of Washington reported that a half pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume the compound under field conditions is by drinking lake or stream water, a half-pound animal would need to drink 33 gallons of water treated at 2 ppm.

The EPA (2007) made the following conclusion for small mammals and large mammals;

*When estimating daily food intake, an intermediate-sized 350 g mammal will consume about 18.8 g of food. Using data previously cited from the common carp with a body weight of 88 grams, a small mammal would only consume 21% (18.8/88) of the total carp body mass. According to the data for common carp, total body residues of rotenone in carp amounted to 1.08 µg/g. A 350-g mammal consuming 18.8 grams represents an equivalent dose of 20.3 µg of rotenone; this value is well below the median lethal dose of rotenone (39.5 mg/kg * 0.350 kg = 13.8 mg = 13,800 µg) for similarly sized mammals. When assessing a large mammal, 1000 g is considered to be a default body weight. A 1000 g mammal will consume about 34 g of food. If the animal fed exclusively on carp killed by rotenone, the equivalent dose would be 34 g * 1.08 µg/g or 37 µg of rotenone. This value is below the estimated median lethal equivalent concentration adjusted for body weight (30.4 mg/kg * 1 kg = 30.4 mg = 30,400 µg). Although fish are often collected and buried to the extent possible following a rotenone treatment, even if fish were available for consumption by mammals scavenging along the shoreline for dead or dying fish, it is unlikely that piscivorous mammals will consume enough fish to result in observable acute toxicity.*

One study, in which rats were injected with rotenone for a period of weeks, reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, the results have been challenged on the basis of methodology: (1) that the continuous intravenous injection method used leads to "continuously high levels of the compound in the blood," and (2) second, that dimethyl sulfoxide (DMSO) was used to enhance tissue penetration (normal routes of exposure actually slow introduction of chemicals into the bloodstream). Finally, injecting rotenone into the body is not a normal way of assimilating the compound. Similar studies (Marking 1988) have found no Parkinson-like results. Extensive research has demonstrated that

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rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982) or cancer (Marking 1988). Rotenone was found to have no direct impact to fetal development of rats that were fed very high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10-1000 ppm rotenone over a 10 day period did not suffer any reproductive dysfunction. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppm and are far below that administered during most toxicology studies.

Similar studies determined that birds required levels of rotenone at least 1,000 to 10,000-times greater than is required for lethality in fish (Skaar 2001). Cutkomp (1943) reported that chickens, pheasants and other members of lower orders of *Galliformes* were quite resistant to rotenone, and four day old chicks were more resistant than adults. Ware (2002) reports that swine are uniquely sensitive to rotenone and it is slightly toxic to wildfowl, but to kill Japanese quail required 4,500 to 7,000 times more than is used to kill fish.

The EPA (2007) made the following conclusion for birds;

*Since rotenone is applied directly to water, there is little likelihood that terrestrial forage items for birds will contain rotenone residues from this use. While it is possible that some piscivorous birds may feed opportunistically on dead or dying fish located on the surface of treated waters, protocols for piscicidal use typically recommend that dead fish be collected and buried, rendering the fish less available for consumption (see Section IV). In addition, many of the dead fish will sink and not be available for consumption by birds. However, whole body residues in fish killed with rotenone ranged from 0.22 µg/g in yellow perch (*Perca flavescens*) to 1.08 µg/g in common carp (*Cyprinus carpio*) (Jarvinen and Ankley 1998). For a 68 g yellow perch and an 88 g carp, this represents totals of 15 µg and 95 µg rotenone per fish, respectively. Based on the avian subacute dietary LC₅₀ of 4110 mg/kg, a 1000-g bird would have to consume 274,000 perch or 43,000 small carp. Thus, it is unlikely that piscivorous birds will consume enough fish to result in a lethal dose.*

Also, if temporary reductions in aquatic invertebrates occur, insectivorous species such as American dippers (*Cinclus mexicanus*), may be impacted to the extent that they rely on aquatic invertebrates for food. Aquatic invertebrate communities typically recover rapidly from disturbance and impacted birds and mammals are mobile and would likely emigrate to nearby habitats until full recovery of the aquatic community.

Chandler and Marking (1982) found that clams and snails were between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation), and southern leopard frog tadpoles were between 3 and 10 times more tolerant than fish. Grisak et al. (2007) conducted laboratory studies on long-toed salamanders, Rocky Mountain tailed frogs, and Columbia spotted frogs and concluded that the adults of these species would not suffer an acute response to Prenfish at trout killing concentrations (0.5-1 mg/L) but the larvae would likely be affected. These authors recommended implementing rotenone treatments at times when the larvae are not present, such as the fall, to reduce the chance of exposure to rotenone treated water and potential impacts to larval amphibians.

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It is important to note that many toxicity studies involve subjecting laboratory specimens to unusually high concentrations of rotenone, or conducting tests on animals that would not normally be exposed to rotenone during use in fisheries management. Based on this information we would expect the impacts to non-target organisms to range from non-existent to short term and minor.

Comment 5d: Big Camas Creek and Camas Lake would be restocked with locally-obtained native WCT when all non-native fishes are removed. Live fish (juveniles and adults) or eyed eggs (in-stream incubators) would be transferred from a non-hybridized population of WCT located in the Little Belt or Castle Mountains. Transfers would follow all MFWP policies for wild fish transfers, including: consultation with the Fish Health Committee, completion of a wild fish transfer request, disease testing, and genetic testing. In addition a separate EA would be developed prior to transfer of WCT into Big Camas Lake/Camas Creek.

Comment 5f: The Big Belt Mountains are within the range of Columbia spotted frogs (*Rana luteiventris*) and western toads (*Bufo boreas*). All of the amphibian species that could be present in the project area prefer to breed in the standing water of ponds, rather than in streams. The areas where rotenone use is proposed in this project are primarily running water. Also, most amphibian larvae (tadpoles) would have already undergone metamorphosis to the less vulnerable adult stage when the proposed stream treatment would occur. Prior to piscicide treatment, surveys will be completed for the presence of amphibian species. In the unlikely event that piscicide treatment was to eliminate any amphibian species, those species would be re-introduced to previously inhabited areas.

There are no threatened or endangered species in the area. Some sensitive species that may infrequently use the area and could potentially ingest dead fish, include fishers (*Martes pennanti*), bald eagles (*Haliaeetus leucocephalus*), and wolverines (*Gulo gulo*). None of these species would be affected by ingestion of dead fish (see Comment 5c). Management indicator species that may infrequently use the area and could ingest fish, include, black bear, mountain lion, bobcat, and golden eagle. None of these species would be affected by ingestion of dead fish (see comment 5c).

Comment 5i: See comment 5d

Cumulative Impacts: Impacts to fish and wildlife from the proposed action would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to fish and wildlife resources in Big Camas Creek/Camas Lake. If the new fishery were to attract more recreational use, fish and wildlife resources could potentially suffer from the increased presence of humans. However, based on use patterns of other WCT fisheries, we would conclude that it is very unlikely that the new WCT fishery would attract significant interest and associated higher use levels. The current YCT fishery would be replaced by a WCT fishery that occupies the same niche and would provide the same ecological functions. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to non-target organisms related to treatment of Big Camas Creek/Camas Lake with piscicides and restoration to a native WCT fishery.

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B.HUMAN ENVIRONMENT

6. <u>NOISE/ELECTRICAL EFFECTS</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Increases in existing noise levels?			X		No	6a
b. Exposure of people to serve or nuisance noise levels?		X				
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				

Comment 6a: The project site is approximately two miles from USFS trailhead 140 (Figure 1). During piscicide treatment there would be increased use of the trailhead for staging, increased foot traffic, and very limited use of motorized off road vehicles to ferry equipment for treatment.

Cumulative Impacts: Increases in noise from the proposed action would be short term and minor. We do not expect the proposed action to result in other actions that would create increased noise in the Big Camas Creek/Camas Lake stream corridor. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to noise from the proposed treatment of Big Camas Creek/Camas Lake with piscicides.

7. <u>LAND USE</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Alteration of or interference with the productivity or profitability of the existing land use of an area?		X				7a
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		X				
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?			X		Yes	7c
d. Adverse effects on or relocation of residences?		X				

Comment 7a: The proposed action would eventually result in a change from a YCT fishery to a WCT fishery. A change to management of Big Camas Creek and Camas Lake as a WCT fishery would not lead to imposition of additional requirements for land users or reduction in the use of livestock. Forest stream bank alteration and riparian area standards would be the same for either

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species and if implemented correctly should protect the basic ecological functioning of the watershed.

Comment 7c: The Camas Lake (#140) trailhead and trail is popular with hikers, horsemen, hunters, and anglers. Access to trail #140 may be limited during piscicide treatment. During treatment with rotenone, the trailhead would be closed for several days. The length of the closure would depend on the amount of time the treated reach remained toxic to fish. The label for CFT Legumine states that detoxification should be terminated when replenished fish survive and show no signs of stress for at least four hours. We would expect the treated water to be non-toxic to fish in 24 to 48 hours after the input of rotenone. Therefore, it can reasonably be expected that the trail closure would last 3 to 4 days total. Camas Lake is shallow and should detoxify relatively rapidly. However, lake treatments tend to take longer to completely detoxify; this may result in a longer closures than the predicted 3 to 4 days. The treatment would be implemented after spring runoff (approximately June 15th) and before the onset of archery hunting season. In addition, treatments would not occur during major holiday weekends (e.g. Fourth of July weekend). At proposed treatment levels, stream water would not be toxic to wildlife or livestock. However, to limit any potential conflict, the treatment would be planned when livestock are pastured elsewhere or livestock would be temporarily moved to adjacent pastures during the treatment period.

Cumulative Impacts: Impacts on land use from the proposed action would be short term and minor. We do not expect the proposed action to result in other actions that would impact land use in the Big Camas Creek/Camas Lake stream corridor. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to land use from the proposed treatment of Big Camas Creek/Camas Lake with piscicides.

8. <u>RISK/HEALTH HAZARDS</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			X		Yes	8a
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?			X		Yes	8b
c. Creation of any human health hazard or potential hazard?			X		Yes	see 8a, 8c
d. Will any chemical toxicants be used?			X		Yes	see 8a

Comment 8a: The principal risk of human exposure to hazardous materials from this project would be limited to the applicators. All applicators would wear safety equipment required by the product labels and MSDS (Material Safety Data) sheets such as respirator, goggles, rubber boots,

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Tyvek overalls, and Nitrile gloves. All applicators would be trained on the safe handling and application of the piscicide. Personnel responsible for application of the detoxifying agent (potassium permanganate) would also be trained on its safe handling and application. At least one, and most likely several, Montana Department of Agriculture certified pesticide applicators would supervise and administer the project. Materials would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill.

Comment 8b: MFWP requires a treatment plan for rotenone projects. This plan addresses many aspects of safety for people who are on the implementation team such as establishing a clear chain of command, training, delegation and assignment of responsibility, clear lines of communication between members, spill contingency plans, first aid, emergency responder information, personal protective equipment, monitoring and quality control, among others. Implementing this project should not have any impact on existing emergency plans. Because an implementation plan has been developed by MFWP the risk of emergency response is minimal and any affects to existing emergency responders would be short term and minor.

Comment 8c: The EPA (2007) conducted an analysis of the human health risks for rotenone and concluded it has a high acute toxicity for both oral and inhalation routes, but has a low acute toxicity for dermal route of exposure. It is not an eye or skin irritant nor a skin sensitizer. The EPA could not provide a quantitative assessment of potentially critical effects on neurotoxicity risks to rotenone users, so a number of uncertainty factors were assigned to the rating values. They are: an additional 10x database uncertainty factor - in addition to the inter-species (10x) uncertainty factor and intra-species (10x) uncertainty factor – has been applied to protect against potential human health effects and the target margin of exposure (MOE) is 1,000. The following table summarizes the EPA toxicological endpoints of rotenone (from EPA 2007):

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Exposure Scenario	Dose Used in Risk Assessment, Uncertainty Factor (UF)	Level of Concern for Risk Assessment	Study and Toxicological Effects
Acute Dietary (females 13-49)	NOAEL = 15 mg/kg/day UF = 1000 aRfD = $\frac{15 \text{ mg/kg/day}}{1000} = 0.015 \text{ mg/kg/day}$	Acute PAD = 0.015 mg/kg/day	Developmental toxicity study in mouse (MRID 00141707, 00145049) LOAEL = 24 mg/kg/day based on increased resorptions
Acute Dietary (all populations)	An appropriate endpoint attributable to a single dose was not identified in the available studies, including the developmental toxicity studies.		
Chronic Dietary (all populations)	NOAEL = 0.375 mg/kg/day UF = 1000 cRfD = $\frac{0.375 \text{ mg/kg/day}}{1000} = 0.0004 \text{ mg/kg/day}$	Chronic PAD = 0.0004 mg/kg/day	Chronic/oncogenicity study in rat (MRID 00156739, 41657101) LOAEL = 1.9 mg/kg/day based on decreased body weight and food consumption in both males and females
Incidental Oral Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day	Residential MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day [M/F] based on decreased parental (male and female) body weight and body weight gain
Dermal Short-, Intermediate-, and Long-Term	NOAEL = 0.5 mg/kg/day 10% dermal absorption factor	Residential MOE = 1000 Worker MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day
Inhalation Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day 100% inhalation absorption factor	Residential MOE = 1000 Worker MOE = 1000	[M/F] based on decreased parental (male and female) body weight and body weight gain
Cancer (oral, dermal, inhalation)	Classification; No evidence of carcinogenicity		

UF = uncertainty factor, NOAEL = no observed adverse effect level, LOAEL = lowest observed adverse effect level, aPAD = acute population adjusted dose, cPAD = chronic population adjusted does, RfD = reference dose, MOE = margin of exposure, NA = Not Applicable

Rotenolenoids are common degradation products found in the parent plant material used to make piscicidal forms of rotenone. The EPA (2007) concluded these degradation products are no more toxic than the active ingredient.

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The EPA analysis of acute dietary risk for both food and drinking water concluded;

When rotenone is used in fish management applications, food exposure may occur when individuals catch and eat fish that either survived the treatment or were added to the water body (restocked) prior to complete degradation. Although exposure from this route is unlikely for the general U.S. population, some people might consume fish following a rotenone application. EPA used maximum residue values from a bioaccumulation study to estimate acute risk from consuming fish from treated water bodies. This estimate is considered conservative because the bioaccumulation study measured total residues in edible portions of fish including certain non-edible portions (skin, scales, and fins) where concentrations may be higher than edible portions (tissue) and the Agency assumed that 100% of fish consumption could come from rotenone exposed fish. In addition, fish are able to detect rotenone's presence in water and, when possible, attempt to avoid the chemical by moving from the treatment area. Thus, for partial kill uses, surviving fish are likely those that have intentionally minimized exposure.

Acute exposure estimates for drinking water considered surface water only because rotenone is only applied directly to surface water and is not expected to reach groundwater. The estimated drinking water concentration (EDWC) used in dietary exposure estimates was 200 ppb, the solubility limit of rotenone. The drinking water risk assessment is conservative because it assumes water is consumed immediately after treatment with no degradation and no water treatment prior to consumption.

Acute dietary exposure estimates result in dietary risk below the Agency's level of concern. Generally, EPA is concerned when risk estimates exceed 100% of the acute population adjusted dose (aPAD). The exposure for the "females 13-49 years old" subgroup (0.1117 mg/kg/day) utilized 74% of the aPAD (0.015 mg/kg/day) at the 95th percentile (see Table). It is appropriate to consider the 95th percentile because the analysis is deterministic and unrefined. Measures implemented as a result of this RED will further minimize potential dietary exposure (see Section IV).

As for evaluating the human chronic risk from exposure to rotenone treated water, the EPA acknowledges the four principle reasons for concluding there is a low risk. First, the rapid natural degradation of rotenone. Second, using active detoxification measures by applicators such as potassium permanganate. Next, properly following piscicide labels which prohibit the use near water intakes. Finally, proper signing, public notification or area closures which limit public exposure to rotenone treated water.

As for recreational exposure, the EPA concludes no risk to adults who enter treated water following the application from dermal and incidental ingestion, but requires a waiting period of 3 days after a treatment before toddlers swim in treated water. The aggregate risk to human health from food, water and swimming does not exceed the EPA level of concern (EPA 2007).

Recreationists in the area would likely not be exposed to the treatments because temporary trail closures would prevent access to the area. Proper warning through news releases, signing the project area, road closure and administrative personnel in the project area should be adequate to keep unintended recreationists from being exposed to any treated waters.

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Fisher (2007) conducted an analysis of the inert constituent ingredients found in the rotenone formulation of CFT Legumine for the California Department of Fish and Game. These inert ingredients are principally found in the emulsifying agent Fennodefo99™ which helps make the generally insoluble rotenone more soluble in water. The constituents were considered because of their known hazard status and not because of their concentrations in the CFT Legumine formulation. Solvents such as xylene, trichloroethylene (TCE) and tetrachloroethylene are residue left over from the process of extracting rotenone from the root and can be found in some lots of CFT Legumine. However, inconsistent detectability and low occurrence in other formulations that used the same extraction process were below the levels for human health and ecological risk. Solvents such as toluene, *n*-butylbenzene, 1,2,4 trimethylbenzene and naphthalene are present in CFT Legumine, and when used in other applications can be an inhalation risk. However, because of their low concentrations in this formulation, the human health risk is low. The remaining constituents-the fatty acid esters, resin acids, glycols, substituted benzenes, and *I*-hexanol-were likewise present but calculated to be below the human health risk levels when used in a typical fish eradication project.

Methyl pyrrolidone is also found in CFT Legumine. It is known to have good solvency properties and is used to dissolve a wide range of compounds including resins (rotenone). Analysis of methyl pyrrolidone in CFT Legumine showed it represents about 9% of the formulation (Fisher 2007). The analysis by Fisher (2007) concluded the following regarding the constituent ingredients in CFT Legumine:

...None of the constituents identified are considered persistent in the environment nor will they bioaccumulate. The trace benzenes identified in the solvent mixture of CFT Legumine™ will exhibit limited volatility and will rapidly degrade through photolytic and biological degradation mechanisms. The PEGs are highly soluble, have very low volatility, and are rapidly biodegraded within a matter of days. The fatty acids in the fatty acid ester mixture (Fennodefo99™) do not exhibit significant volatility, are virtually insoluble, and are readily biodegraded, although likely over a slightly longer period of time than the PEGs in the mixture. None of the new compounds identified exhibit persistence or are known to bioaccumulate. Under conditions that would favor groundwater exchange the highly soluble PEGs could feasibly transmit to groundwater, but the concentrations in the reservoir, and the rapid biodegradation of these constituents makes this scenario extremely unlikely. Based upon a review of the physical chemistry of the chemicals identified, we conclude that they are rapidly biodegraded, hydrolyzed and/or otherwise photolytically oxidized and that the chemicals pose no additional risk to human health or ecological receptors from those identified in the earlier analysis. None of the constituents identified appear to be at concentrations that suggest human health risks through water, or ingestion exposure scenarios and no relevant regulatory criteria are exceeded in estimated exposure concentrations...

The CFT Legumine MSDS states “...when working with an undiluted product in a confined space, use a non-powered air purifying respirator...and... air-purifying respirators do not protect workers in oxygen-deficient atmospheres...” It is not likely that workers would be handling CFT

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Legumine in an oxygen deficient space during normal use. However, to guard against this, proper ventilation and safety equipment would be used according to the label requirements.

The advantage of CFT Legumine over Prenfish is that it has less petroleum hydrocarbon solvents such as toluene, xylene, benzene and naphthalene. By comparison, Prenfish has a strong chemical odor. CFT Legumine is virtually odor-free and performs almost identically to Prenfish.

In their description of how South American Indians prepare and apply *Timbó*, a rotenone parent plant, Teixeira et al. (1984) reported that the Indians extensively handled the plants during a mastication process, and then swam in lagoons to distribute the plant pulp. No harmful effects were reported. It is important to note that the primitive method of applying rotenone from root does not involve a calculated target concentration, metering devices, or involve human health risk precautions as those involved with fisheries management programs.

A recent study linked the use of rotenone and paraquat with the development of Parkinson's disease (PD) in humans later in life (Tanner et al. 2011). The after the fact study included mostly farmers from 2 states within the United States who presumably used rotenone for terrestrial application to crops and/or livestock. Rotenone is no longer approved for agricultural uses and is only approved for aquatic application as a piscicide. The results of epidemiological studies of pesticide exposure, such as this one have been highly variable (Guenther et al. 2011). Studies have found no correlations between pesticide exposure and PD (e.g., Jiménez-Jiménez 1992; Hertzman 1994; Engel et al. 2001; Firestone et al. 2010), some have found correlations between pesticide exposure and PD (e.g., Hubble et al. 1993; Lai et al. 2002; Tanner et al. 2011) and some have found it difficult to determine which pesticide or pesticide class is implicated if associations with PD occur (e.g., Engel et al. 2001; Tanner et al. 2009). Recently, epidemiological studies linking pesticide exposure to PD have been criticized due to the high variation among study results, generic categorization of pesticide exposure scenarios, questionnaire subjectivity, and the difficulty in evaluating the causal factors in the complex disease of PD, which may have multiple causal factors (age, genetics, environment) (Raffaele et al. 2011). A specific concern is the inability to assess the degree of exposure to certain chemicals, including rotenone, particularly the concentration of the chemical, frequency of use, application (e.g., agricultural, insect removal from pets), and exposure routes (Raffaele et al. 2011). No information is given in the Tanner et al. (2011) study about the formulation of rotenone used (powder or liquid) or the frequency or dose farmers were exposed to during their careers. There is also no information given about the personal protective equipment used or any information about other pesticides farmers were exposed to during the period of the study. It is also unclear in the Tanner et al. (2011) study the frequency and the dose individuals were exposed to during the time period of use. Without information on how much rotenone individuals were exposed to and for how long, it is difficult to evaluate the potential risk to humans of developing Parkinson's disease from aquatic applications of rotenone products.

The state of Arizona conducted an exhaustive review to the risks to human health of rotenone use as a piscicide (Guenther et al. 2011). They concluded: "To date, there are no published studies that conclusively link exposure to rotenone and the development of clinically diagnosed PD. Some correlation studies have found a higher incidence of PD with exposure to pesticides among other factors, and some have not. It is very important to note that in case-control correlation

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studies, causal relationships cannot be assumed and some associations identified in odds-ratio analyses may be chance associations. Only one study (Tanner et al. 2011) found an association between rotenone and paraquat use and PD in agricultural workers, primarily farmers. However, there are substantial differences between the methods of application, formulation, and doses of rotenone used in agriculture and residential settings compared with aquatic use as a piscicide, and the agricultural workers interviewed were also exposed to many other pesticides during their careers. Through the EPA re-registration process of rotenone, occupational exposure risk is minimized by: new requirements that state handlers may only apply rotenone at less than the maximum treatment concentrations (200 ppb), the development of engineering controls to some of the rotenone dispensing equipment, and requiring handlers to wear specific PPE.”

It is clear that to reduce or eliminate the risk to human health, including any potential risk of developing Parkinson’s disease, public exposure to rotenone treated water must be eliminated to the extent possible. To reduce the potential for exposure of the public during the proposed use of CFT Legumine to restore WCT, areas treated with rotenone would be closed to public access during the treatment. Signs would be placed at access points informing the public of the closure and the presence rotenone treated waters. Personnel would be onsite to inform the public and escort them from the treatment area should they enter. Rotenone treated waters would be contained to the proposed treatment areas by over 1 mile of dry channel and if necessary, adding potassium permanganate to the stream at the downstream end of the treatment reach, either at the fish barrier or downstream where the stream re-surfaces. Potassium permanganate would neutralize any remaining rotenone before leaving the project area. The efficacy of the neutralization would be monitored using fish (the most sensitive species to the chemical) and a hand held chlorine meter. Therefore, the potential for public exposure to rotenone treated waters is very minimal. The potential for exposure would be greatest for those government workers applying the chemical. To reduce their exposure, all CFT Legumine label mandates for personal protective equipment would be adhered to (see Comment 8a).

Cumulative Impacts: Health hazards from the proposed action would be short term and mitigated through use of proper safety equipment, etc. We do not expect the proposed action to result in other actions that would increase the risk of health hazards in the Big Camas Creek/Camas Lake stream corridor. We do not foresee any other activities in the basin that would add to health impacts of the proposed action. As such there are no cumulative impacts related health hazards from the proposed treatment with piscicides.

9. <u>COMMUNITY IMPACT</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				

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d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		X				

10. <u>PUBLIC SERVICES/TAXES/UTILITIES</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Will the proposed action have an effect upon or result in a need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify: _____		X				
b. Will the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Will the proposed action result in a need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		X				
d. Will the proposed action result in increased used of any energy source?		X				
e. Define projected revenue sources		X				
f. Define projected maintenance costs		X				

11. <u>AESTHETICS/RECREATION</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		X				
b. Alteration of the aesthetic character of a community or neighborhood?		X				
c. Alteration of the quality or quantity of recreational/tourism opportunities and			X		Yes	See 11c

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settings? (Attach Tourism Report)						
d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

Comment 11c: In 2007, a fishing pressure survey indicated that Camas Lake received 56 hours of use. This level of use puts Camas Lake at a rank 1,028 in the State of Montana. The regional rank for Camas Lake was estimated at 256. These estimates are probably lower than actual use. Camas Lake is a popular fishery, especially during holiday weekends; Fourth of July, Labor Day Weekend, and Memorial Day Weekend. In addition, the area is popular with big game hunters. There would be a temporary loss of angling opportunity in Camas Lake and Big Camas Creek between the time of fish removal and for several years after fish stocking. Camas Lake and Big Camas Creek should be fully colonized with WCT within 5 to 7 years of project implementation. In most cases cutthroat trout fisheries in streams in Montana are catch and release only. The general fishing regulations for cutthroat trout in lakes and reservoirs in the Central Fishing District is currently 5 fish per day with 10 in possession. During re-colonization, regulations would likely require release of stocked wild WCT until Camas Lake reached a harvestable population. Sterile triploid hatchery WCT may also be stocked in the interim to support a harvestable fishery. These stocked hatchery fish would have an identifiable fin clip to prevent harvest of stocked native WCT. Big Camas Creek would remain a catch and release fishery. After recolonization of WCT, the Big Camas Creek and Camas Lake fishery would provide an extremely unique opportunity to fish for Montana's state fish in a relatively pristine location on the Helena National Forest.

Cumulative Impacts: Impacts to recreation and aesthetics from the proposed action would be short term and minor. We do not expect the proposed action to result in other actions that would impact recreation/aesthetics in the Big Camas Creek/Camas Lake stream corridor. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to recreation/aesthetics from the proposed treatment of Big Camas Creek/Camas Lake with piscicides.

<u>12. CULTURAL/HISTORICAL RESOURCES</u>	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action result in:						
a. Destruction or alteration of any site, structure or object of prehistoric, historic, or paleontological importance?		X				
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				12c
d. Will the project affect historic or cultural resources?		X				

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Comment 12c: The project site is located within the aboriginal range of several Native American tribes. Cultural officers for tribes which would have interest in this project will be consulted prior to the completion of any decision making process.

13. SUMMARY EVALUATION OF SIGNIFICANCE	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
Will the proposed action, considered as a whole:						
a. Have impacts that are individually limited, but cumulatively considerable?		X				
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		X				13d
e. Generate substantial debate or controversy about the nature of the impacts that would be created?	X	X			Yes	13e
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)	X	X				13f
g. List any federal or state permits required.						13g

Comment 13d: This project does not establish a precedent or likelihood that additional projects with significant environmental effects would be proposed. We are not planning any additional rotenone WCT restoration projects on the western edge of the Big Belt Mountains. Rotenone restoration projects are limited to sites that already have good barriers or locations where a barrier could be built; i.e. bedrock, incised channels, etc.

Comments 13e and f: The use of pesticides can generate controversy from some people. Public outreach and information programs can educate the public on the use of pesticides. It is not known if this project would have organized opposition.

Comment 13g: The following permits would be required for the piscicide treatment:

MFWP would apply rotenone under the Montana Dept. of Environmental Quality (DEQ) General Permit for Pesticide Application (#MTG87000). A Notice of Intent was accepted by the Department of Environmental Quality. The NOI included the waters proposed in this

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EA. A letter was received from DEQ dated August 13, 2012 recognizing the Notice of Intent and allowing MFWP to operate under the General permit for Pesticide Application.

The department has and will continue to coordinate with the Helena National Forest during the planning and development phases of this project. No special use permit is required.

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PART III. ALTERNATIVES

Alternative 1 – No Action

The no action alternative would allow status quo management to continue which would maintain the present angling quality and species diversity in Big Camas Creek and Camas Lake. Big Camas Creek and Camas Lake would continue to support a YCT population. Replication of an existing non-hybridized WCT population in the Smith Drainage would not occur. The risk of WCT extinction in the Smith Drainage would not decrease.

Alternative 2 – Proposed Action

The proposed action includes removing existing non-native fish in Big Camas Creek and Camas Lake with rotenone and restocking with locally obtained non-hybridized westslope cutthroat trout upstream of an existing barrier.

The predicted benefits of Alternative 2 include:

- Increase in total miles of non-hybridized WCT inhabited stream in the Smith Drainage from 13 to 16.5 miles (a 27% increase in the Smith Drainage) and restoration of a 6 surface acre natural lake.
- Replication of an existing population of non-hybridized WCT in the Smith Drainage.
- Reduction in the risk of potential listing under the Endangered Species Act.
- This project would also provide a unique opportunity for anglers to fish for Montana's native trout in an accessible area of the Helena National Forest.

Alternative 3 – Mechanical removal

Electrofishing has been used to remove unwanted fish from streams with some success in northcentral Montana (Big Coulee Creek, Middle Fork Little Belt Creek, and Cottonwood Creek; Moser 2008). Streams in which brook trout have been selectively removed to protect WCT have been shorter in length but of similar channel complexity to Big Camas Creek. In general these efforts have been limited to simple 1st to 2nd order streams where brook trout are out-competing non-hybridized WCT. To remove fish in small streams electrofishing efforts require repeated shocking of all habitats for an extended period of time. As an example, brook trout were selectively removed from Big Coulee Creek, a small stream (1.5 miles in length) in the Highwood Mountains. This effort has required multiple pass backpack electrofishing (two crews over 1 to 2 weeks per year) for 6 years. Electrofishing removal projects are also generally limited to streams with non-native non-hybridizing species such as brook trout or brown trout; Big Camas Creek would be precluded because of the presence of a hybridizing species. If a few hybrids were missed during removals they would likely hybridize with restored WCT negating the primary goal of restoration. Moreover, even if all non-native YCT could be removed from Big Camas Creek removal of all non-native YCT from Camas Lake using gill nets or trap nets would have a little chance of success and would likely require years of effort. Because of these difficulties this alternative was removed from consideration.

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PART IV. ENVIRONMENTAL ASSESSMENT CONCLUSION SECTION

A) *Is an Environmental Impact Statement Required (EIS)?*

No. An EIS is not required under the Montana Environmental Policy Act (MEPA) because the project lacks significant impacts to the physical, biological or human environment. Impacts of the proposed action are expected to be short-term and minor, and are appropriately addressed through an Environmental Assessment.

B) *Public involvement:*

The public will be notified through local newspapers and through contact with local landowners, sporting and recreational groups, and others who have previously indicated interest in similar projects. This EA will also be published on the Montana Fish, Wildlife & Parks web page (<http://fwp.mt.gov/news/publicNotices/>). The public comment period will be open for at least 30 days. This level of public involvement is believed adequate for the proposed project as recent and similar type piscicide efforts in the FWP Region 4 have produced no significant issues or controversy.

C) *Addresses to submit written comments:*

Public comments can be given at the FWP web page (<http://fwp.mt.gov/news/publicNotices/>), or in writing to:

Montana Fish, Wildlife & Parks
c/o Big Camas Cr/Camas Lake EA Comments
4600 Giant Springs Rd.
Great Falls, MT 59405

or by email to: gliknes@mt.gov

Comments on the EA will be accepted until 5:00 pm, July 21, 2013. Please include name and address with any comment.

D) *Name, title, address, and telephone number of the person responsible for preparing this EA document:*

David Moser
Fisheries Biologist
Montana Fish, Wildlife & Parks
4600 Giant Springs Road
Great Falls, MT 59405
(406) 791-7775

Prepared by: David Moser

Date: 12/13/2012

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